SYNOPSIS

ON

AN ANALYSIS OF RISK MEASUREMENT TECHNIQUES OF SELECTED MUTUAL FUND SCHEMES IN INDIA

FOR THE REGISTRATION OF DOCTOR OF PHILOSOPHY IN MANAGEMENT

BY

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SECTION 1: INTRODUCTION

1.1 Risk Management

Risk is an unexpected event and uncertainty which investors are willing to take while investing in securities. Risk management techniques help to evaluate and estimate volatility involved in particular security and this volatility can be managed through avoidance, diversification, distribution, reduction etc. there are various risk management techniques which help investors to diversify their risk and provide reasonable return. Risk management technique is an approach which focuses on measuring risk and volatility of funds and helps to identify the portfolio for investment which minimizes risk and maximizes return. Risk measuring techniques have been developed by Statisticians and Economist to construct portfolio of several given securities in the market by identifying lower risk and higher return from the current market. In 1952 Harry Markowitz has introduced concept of Mean-Variance (Expected Return v/s Standard Deviation) model into modern portfolio theory which help investors to identify the securities to construct portfolio to diversify volatility and generate high yield. In 1961, Jack Treynor developed Treynor Ratio to measure as the highest and lowest excess return generated by the performance of fund at a given level of risk free rate of return. In 1964, William Sharpe developed Sharpe ratio to measure performance of fund at a given level of risk. In 1968, Michael Jensen has developed Jensen's Alpha ratio to evaluate risk adjusted return of mutual fund securities. In 1983, Dr. Frank A. Sortino has introduced the concept of Sortino ratio which helps to identify the fund which has least volatility and maximum return. Various risk management tools are used by mutual fund managers to evaluate and identify the funds for investors to minimize risk and maximize return.

From the previous researches it is found that fund manager frequently used Standard Deviation, Beta, Sharpe ratio etc. to measure risk of Mutual fund schemes. Fund manager don't use other systematic and unsystematic risk tools to measure risk of Mutual fund schemes. In the present study Standard Deviation and Beta are used as traditional tools while Safety First Criterion and Treynor Ratio as modern tools to measure risk. The present study helps mutual fund risk

manager to identify and compare the appropriate risk measuring techniques for mutual fund. This study helps to use efficient risk measuring techniques for creating efficient portfolio for investment.

1.2 Mutual Fund Industry

In economic growth of India financial sector plays an important role. Now a day's financial market are emerging as a strongest and fastest growing service sector in India. In financial market Mutual Fund is the strongest financial intermediary which create a link between various securities market and investors by mobilizing investors' money and investing in several mutual fund schemes by minimizing risk and generating maximum returns from the market. Mutual fund is a trading business in which huge amount of transaction is done among various market securities and provide current market value to the investors.

In India the mutual fund was first set up by UTI in 1963 and Government of India in 1987 allowed various Public Sector banks and Life Insurance Corporation and General Insurance Corporation to enter in the mutual fund industry. After UTI, SBI was the first bank who started dealing with mutual fund industry in 1987. In 1993 Franklin Templeton was the first private sector bank who started business in mutual fund industry. Now every public sector and private sector banks deals with mutual play industry. Today there are 44 mutual fund houses with 10 lakh crore asset under management. From 1996, SEBI regulated the Mutual Fund Industry to enhance and protect the interest of investors. Individual mutual fund house have Asset Management Company and it is compulsory for every AMC of mutual fund to get registered under SEBI. The main role of AMC is to manage and invest the investors saving in various mutual fund schemes to generate current market value. The Security and Exchange Board of India (Mutual Funds) Regulations, 1996 define mutual fund "A fund establishment in the form of a trust to raise money through the sale of units to the public or a section of the public under one or more schemes for investing in securities, including money market instruments." The main aim of mutual fund is to construct portfolio which diversify risk and provide maximum

return from the market. Mutual fund industry is growing in a fastest pace because now most of the sectors like FMCG, IT, Automobile etc are also involved in the trading business of mutual fund. Mutual fund industry's future is bright because there are many opportunities available in the domestic as well as in global financial market.

1.2.1 Types of Mutual Fund

There are different types of Mutual fund related with different risk and return grade level. The fund with high level of risk generate high return while fund with low level of risk generate low return as it is explained with the help of Diagram given below:

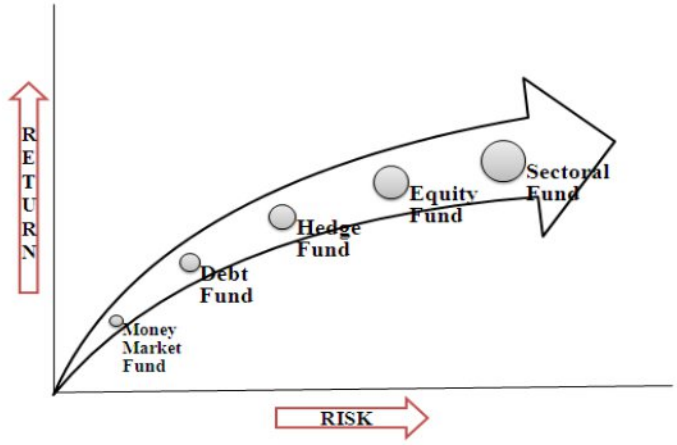

Figure 1: Risk and Return Hierarchy of Different Mutual Funds

There is wide variety of mutual fund schemes available in the market. Investor can construct their portfolio according to their need which minimizes the risk and provide high return. According to investment objective there are different types of mutual fund like debt fund, equity fund, hedge fund, index fund, gilt fund, income fund, liquid fund, balanced fund, sectoral fund, Tax saving fund, money market funds, growth funds etc. These funds have different risk and return level. Generally those funds that bear high risk generate high return like equity fund, sectoral fund, index fund, hedge fund etc. but those funds which have low risk generate lower return like debt fund, gilt fund and liquid fund which is issued by the government. There is a

positive relationship between risk and return as when risk is high then return is also high and when risk is low then return is also low of particular fund.

1.3 Various Types of Risk Associated with Mutual Fund

Mutual fund managers consider various types of risk while constructing domestic and international portfolio like Credit risk, Inflation risk, Interest rate risk, Market risk, Principal risk, Currency risk, Industry risk etc. The main objective of portfolio management is to create portfolio of Debt, Equity and other securities to diversify risk and provide maximum return.

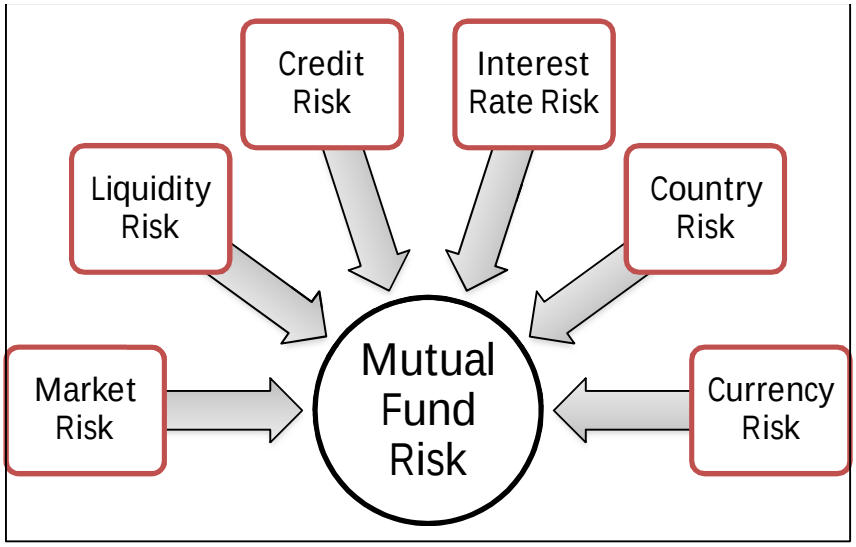

Figure 2: Different Types of Mutual Fund Risk

The way to identify the volatility of funds is to know the returns and performance of schemes. The broader category of risk related with mutual fund are systematic risk and unsystematic risk. Systematic risk cannot be diversified and provide current market value to the investors. Unsystematic risk is diversifiable in nature which helps to identify the funds of various industries and create portfolio to diversify risk. Debt, Equity and Hedge Fund consider Market risk and Liquidity risk which is unavoidable and get affected by market movements. Credit risk and Interest rate risk affect Fixed Income Securities. Country risk is considers while making investments in foreign countries. Currency Risk affects the particular country whose currency value is declined. The mutual fund risk depends on the type of the mutual fund schemes investment.

1.4 PROFILE OF SELECTED MUTUAL FUND

Mutual fund scheme is selected on the basis of CRISIL Mutual Fund ranking (2014) in which top two rated Equity Fund, Debt Fund and Hybrid Fund are selected. While ranking funds CRISIL considered the NAV history performance, annualized absolute returns and portfolio performance of the funds. On the basis of these variables open ended schemes performed better. The NAV value which is the market value is taken to analyze selected mutual fund schemes. The selected mutual fund schemes are given below.

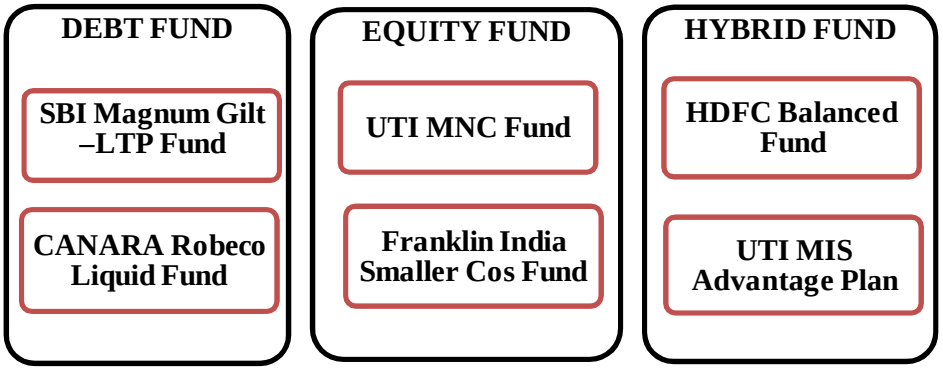

Figure 3: Mutual Fund Schemes

1.4.1 Debt Fund

a) **SBI Magnum Gilt –LTP Fund:** SBI Magnum Gilt Fund was launched on 1 January, 2001. It is an Open Ended Scheme with the aim to invest in government securities and generate high return from the investment. The average period of investment in Gilt funds is more than 3 years.

b) **CANARA Robeco Liquid Fund:** CANARA Robeco Liquid Fund is an Open Ended Fund which was launched on 14 July, 2008 with the objective to maintain high level of liquidity by increasing income. The investment is made in Money Market instrument and Debt instrument.

1.4.2 EQUITY FUND

a) **UTI MNC Fund:** UTI MNC Fund is an Open Ended Fund which was launched on 29 May, 1998. The investment is done on Equity instrument of Multinational companies of several sectors like FMCG, Automobile, and IT etc. The funds involve high level of risk and also generate high return.

b) **Franklin India Smaller Cos Fund:** Franklin India Smaller Cos Fund is an Open Ended Scheme which was launched on 14 December, 2005. The investment is done on small and mid-cap companies to provide long term capital gains. It involves high risk and generates high return.

1.4.3 HYBRID FUND

a) **HDFC Balanced Fund:** HDFC Balanced Fund is an Open Ended Fund launched on 11 September, 2000. The investment is done in Equity, Debt and Money Market Instrument with objective to minimize risk and provide current market value to the investors.

b) **UTI MIS Advantage Plan:** UTI MIS Advantage Plan is an Open Ended Scheme, launched on 16 December, 2003. The investment is made on Fixed Income Securities and on Equity related Instrument with the objective to provide regular income to the investors.

SECTION 2: LITERATURE REVIEW

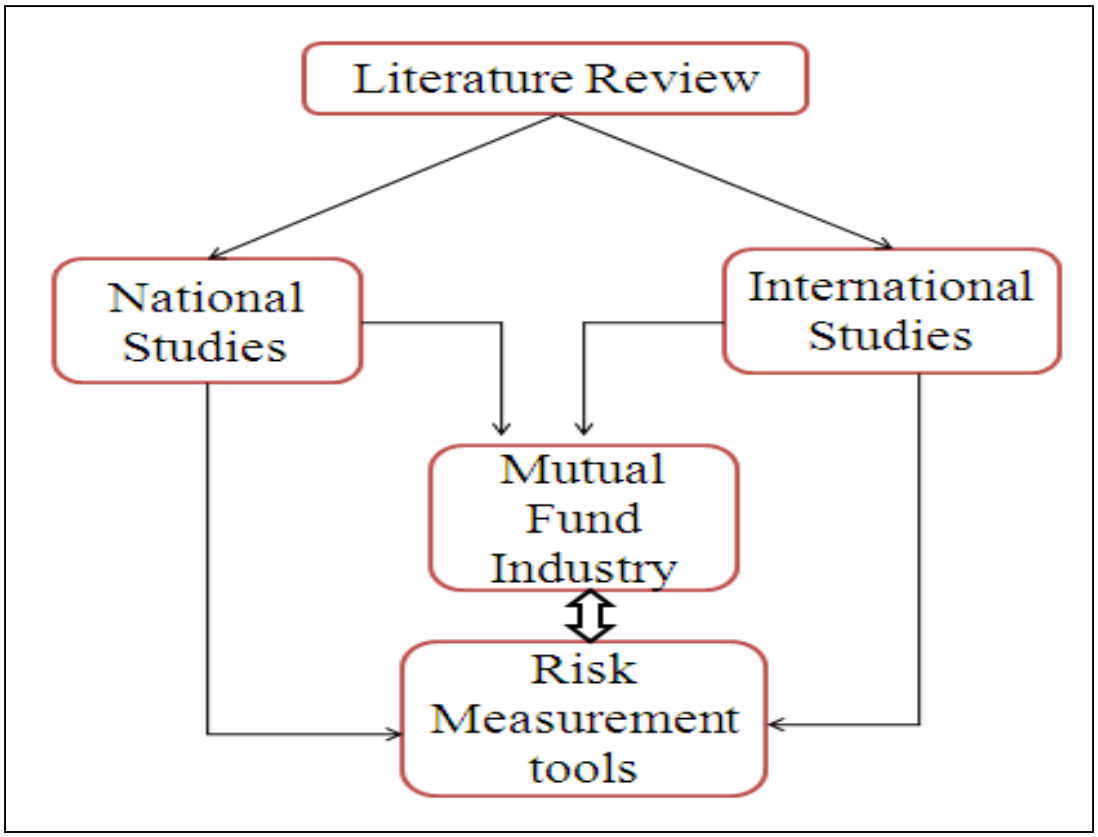

Figure 4: Literature Review Snapshot

The literature review of present study is done on the basis of national and international studies. There are various studies conducted on national and international level which includes the study of various different types of mutual fund. The various types of systematic and unsystematic tools are used to measure the risk and to identify those funds or securities which provide high return at a low risk. Various researchers had also studied investor's behaviour towards mutual funds and their investment strategies. From the previous studies it is identified that traditional tools (Standard Deviation, Sharpe Ratio, Variance, Beta and Alpha) are used very frequently to measure the risk of different types of mutual funds. Various mutual fund risk manager and investors construct their portfolio or identify fund which minimizes volatility because there is a positive relationship between risk and return.

2.1 National Studies

There are various national studies conducted by researcher to know the level of risk of different mutual funds that help fund manager and investors to identify those funds which minimizes volatility. From the table it is identified that the most of the study is conducted on equity and growth mutual funds and less study is conducted on debt and balanced mutual funds. In the table it is shown that to identify the risk of particular fund Sharpe ratio, Treynor ratio, Beta, Alpha, Standard Deviation, and Variance these tools are used very frequently. In the previous studies $R^{2,}$ Covariance, Markowitz Model, Sortino Ratio, MAD tools are used very less to identify the level of risk of different mutual funds.

Table 1: Tabular Summary of National Studies

Author	Years Selected	Different Types of Mutual Fund				Risk Measuring Tools										
		Debt	Equity	Balanced	growth	Variance	Sharpe	Treynor	SD	BETA	Alpha	R^2	Covariance	Markowitz Model	Sortino	MAD
Tae-Hyuk Kim	1985-2003															
Larry J. Prather	1989-1999															
Frank Bacon	1997-2006															
Sahil Jain	1997-2012															
Rajesh R. Duggimpudi	2000-2009															
Lam Weng Hoe	2004-2007															
Nur Atiqah Abdullah	2004-2008															
Abhijit Kundu	2005-2008															
Talat Afza	2005-2010															
Abbas Sarijalooa	2006-2009															
Prof. Kalpesh Prajapati	2007-2011															
Prof. Fang Qiang	2008-2009															
K.Srinivas Reddy	2009-2012															
Md.Qamruzzamn	2012-2013															
Dr. Rajeev Jain	2013															

2.2 International Studies

From the table it is identified that most of the international studies are being conducted on equity mutual funds and less study is conducted on debt, balanced, growth and hedge mutual funds. In the table it is shown that to identify the risk of particular fund Sharpe ratio, Treynor ratio, Beta, Alpha, Standard Deviation, Variance and R^2 these tools are used very frequently. In the previous international studies Covariance, Markowitz Model, Sortino and sterling ratio tools are used very less to identify the level of risk of different mutual funds.

Table 2: Tabular Summary of International Studies

Author	Year selected	Different Types of Mutual Fund						Risk Measuring Tools									
		Debt	Equity	Balanced	Growth	Dividen	Hedge	Varianc	Sharpe	Treynor	SD	Beta	Alpha	R^2	Covaria	Markowitz	Sortino	Sterling
Jean-Luc Prigent	1997-2007																	
Philip Hsu	1998-2002																	
Hussain Ali Bekhet	2000-2006																	
Dr.Sandeep Bansal	2001-2005																	
AmpornSoongswang	2002-2007																	
Mitul Parmar	2005-2009																	
Pegah Kolbadi	2005-2010																	
Dr.Sandeep Bansal	2005-2010																	
Dr. Rupeet Kaur	2006-2011																	
P.Varad harajan	2006-2011																	
Harun Rashid Howlader	2006-2012																	
Dr. Rajesh Manik	2008																	
Md. Salah Uddin	2008-2010																	
Dr. R. Karrupasamy	2008-2013																	
Dr.R.Narayanasamy	2010-2012																	

2.3 Risk Measurement Tools

The table given below shows that there are various risk measuring tools developed by statisticians to measure the risk adjusted return, drawdown and downside risk that help fund managers and investors to identify the funds and construct their portfolio which would minimize the risk.

Table 3: Risk Measurement Tools

Risk Tools	Year	Statisticians
Coefficient of Determination	1880	Francis Galton
Standard Deviation	1894	Karl Pearson
Variance	1918	Ronald Fisher
Modern Portfolio Theory	1952	Harry Markowitz
Safety First Criterion	1952	A.D.Roy's
Fama Decomposition	1960	Eugene Fama
Treynor Ratio	1965	Jack L. Treynor
Sharpe Ratio	1966	William Forsyth Sharpe
Alpha	1968	Michael Jensen
Appraisal Ratio	1973	Treynor& Black
Beta	1977	Joseph Williams
sterling Ratio	1981	Deane Sterling Jones
Sortino Ratio	1983	Dr. Frank A. Sortino
Ulcer Index	1987	Peter Martin
calmar Ratio	1991	Terry W. Young
Burke Ratio	1994	Burke
Omega Ratio	2002	Keating &Shadwick
Prospect Ratio	2006	Watanabe
Adjusted Sharpe Ratio	2006	Thomas Becker
Pain Index	2006	Pezier

In the past the performance of funds was only measured with the help of rate of return. Markowitz (1952) & Tobin (1958) suggested Mean-Variance to measure volatility in terms of market variability of returns. Treynor (1965), Sharpe (1966) and Jensen (1968) make comparison between the risk adjusted returns of professionally managed portfolios to that of some standard benchmark. Cumby & Glen (1990) and Lahbitant (1995) analyzed that Mutual Funds are under performing to their benchmark. Murthi (1997) identified the problem in performance of traditional tools while constructing appropriate portfolio for investment. So, due to these problems Murthi (1997) introduced Data Envelopment Analysis (DEA) to measure the performance efficiently. In India, Chander (2000) found the Mutual funds outperform while Singh & Singla (2000) found that Mutual funds underperform to their benchmark. Gupta (2001) found that mutual fund are outperformed as well as underperform to their standard benchmark. Galagedera & Silvapulle (2002) found that mutual funds were efficient in terms of returns in long term. Lin and Chen (2008) found the number of mutual funds generate higher return at a given level of risk in the year 2003 than 2001 and2002. Soongswang & Sanohdontree (2011) found that mutual fund provide varied return.

SECTION 3

3.1 NEED OF THE STUDY

Now a day's mutual fund industry is an attractive investment avenue for investors which facilitate the investors to invest and construct their portfolio according to their requirements. Mutual fund industry is expanded to a large scale where various mutual fund products are offered by various sectors like banking, automobile, FMCG, IT etc. Several researches have been conducted in risk measuring techniques of mutual fund industry, in most of the research studies standard deviation, beta, Sharpe ratio have been used to measure risk. So, present study emphasis on the comparison of traditional tool like Standard Deviation, Beta and modern tool like Safety First Criterion Ratio and Treynor Ratio for risk measuring of mutual fund industry. This particular study would help to understand the present scenario and future opportunities of Mutual Fund Industry and also helps to compare the performance of various Mutual Funds like Debt fund, Equity fund, and Hybrid fund. Proposed research work would reveal various advantages and disadvantages of risk measuring technique and to know appropriate risk measuring techniques for mutual fund. This study helps fund managers and investors to identify the funds and construct their portfolio which would minimizes the risk and maximize the return. The objective of providing assistance to all the stakeholders of mutual fund industry would be fulfilled with this research work. This analytical research work would help to compare the Traditional tools and Modern tools of risk measurement for mutual fund schemes.

3.2 OBJECTIVES OF THE STUDY

The main objectives of the proposed study are as follows:-

a) To compare Traditional tools and Modern tools of risk measurement for mutual funds.
b) To compare the average risk pattern of Debt funds, Equity funds and Hybrid funds.
c) To identify appropriate risk measurement techniques for mutual funds on the basis of forecasted tools.

3.3 SCOPE OF THE STUDY

The study will be conducted in Agra and New Delhi Region. The study highlights various risk measuring techniques for mutual fund schemes. The study also covers various Mutual Funds like Equity Fund, Debt Fund and Hybrid Fund. The study is applicable for the risk managers to identify appropriate risk measuring techniques for mutual fund industry. The proposed study assists Fund managers and investors to identify the funds and construct their portfolio which diversify the risk. The proposed study is benefited to all the risk managers of the mutual fund industry.

SECTION 4: RESEARCH METHODOLOGY

4.1 Hypothesis: In order to know the difference in risk level and performance of various mutual funds and to know the difference in modern and traditional tools of risk measuring various hypothesis are formulated to test the validity.

H_1: From the previous researches it is identified that fund manager frequently used traditional tools to measure risk of Mutual fund schemes. Fund manager do not use modern tools to measure risk of Mutual fund schemes. In the present study Standard Deviation and Beta are used as traditional tools while Safety First Criterion Ratio and Treynor ratio as modern tools to measure risk. To identify the appropriate risk measuring techniques for mutual fund risk manager it is hypothesized:

H_{01}: There is no difference in the traditional tools and modern tools of risk measurement for mutual funds.

H_{a1}: There is a difference in the traditional tools and modern tools of risk measurement for mutual funds.

H_2: There is wide variety of mutual fund schemes available in the market. Investor can construct their portfolio according to their need which minimizes the risk and provide high return. According to investment objective there are different types of mutual fund like debt fund, equity fund, hedge fund, index fund, gilt fund, income fund, liquid fund, balanced fund, sectoral fund, Tax saving fund, money market funds, growth funds etc. The present study includes debt fund,

equity fund and hybrid fund which consider Market risk and Liquidity risk which is unavoidable. To identify the risk level of Debt fund, Equity fund and Hybrid fund it is hypothesized:

H_{02}: There is no difference in the average risk pattern of Debt Fund, Equity Fund and Hybrid Fund.

H_{a2}: There is difference in average risk pattern of Debt Fund, Equity Fund and Hybrid Fund.

4.2 Nature of the Study: The present study is Descriptive and Analytical. The study is descriptive because it studies the current state of mutual fund industry with respect to risk measurement techniques. Proposed research work would reveal various advantages and disadvantages of risk measuring technique. The study is analytical because it considered various Traditional and modern tools to measure risk and to compare the average risk pattern of Equity, Debt and Hybrid fund. This particular study would help to understand the present scenario and future opportunities of Mutual Fund Industry and also helps to identify appropriate risk measuring techniques for mutual fund.

4.3 Data Collection: The present study is based on both primary and secondary data to satisfy the proposed objectives of the study.

4.3.1 Primary Data: To fulfill the objective of the proposed study primary data will be collected from the Risk Manager of various Mutual Funds through questionnaire method. The reliability and validity of the questionnaire would be measured on the basis of pilot study.

4.3.1.1 Sampling Techniques

The Judgmental sampling technique will be used to collect information and data from various mutual funds Risk Manager. The present study deals with the analysis of risk measurement techniques and the risk manager is the only person who can provide the relevant information which is useful for the particular study.

4.3.1.2 Sample Area Coverage

The area for study will be Agra and New Delhi. The particular region is selected for the study because some mutual fund registered offices are in New Delhi from where the data is collected from the risk managers. From the Agra region the data is collected from the risk managers of various mutual funds.

4.3.1.3 Sample Size of Risk Managers of Mutual Fund

The proposed study includes 49 mutual fund houses which are registered under SEBI. So, 49 mutual fund houses is the finite population. According to standard rule when there is finite population then to determine the appropriate sample size we will take 50% of finite population which is true representation of the whole population. So, 50% 0f 49 is 24.5. For the present study 25 Sample sizes of Risk Manager's mutual fund houses is determined. For the present study half of the finite population will be considered. For the proposed study 25 risk managers of various mutual funds will be selected randomly which are registered under SEBI out of 49 mutual fund houses.

4.3.2 Secondary Data: To attain the purpose of research various sources like journals, articles, books, blogs, newspaper, websites, and reports are used to collect the Secondary data. Secondary data will be also collected with the help of NAV values of selected Mutual Fund Schemes. The mutual fund scheme is selected on the basis of CRISIL Mutual Fund ranking in which top two rated Equity Fund, Debt Fund and Hybrid Fund are selected. The various traditional, modern and forecasted risk measurement tools are used to analyze the NAV values of selected mutual fund schemes.

4.3.2.1 Time Period: The NAV Values of selected mutual fund scheme will be collected from 2011 -2015. The study will be conducted for five years to know the Risk and Return level of Mutual Fund schemes.

4.3.2.2 Statistical Tools

To test the given hypothesis for the proposed study appropriate statistical tools are used which are as follows:

Risk Measuring Tools Used to Measure Different Types of Mutual Funds: On the basis of CRISIL Mutual Fund ranking (2014) top two rated Equity Fund, Debt Fund and Hybrid Fund are selected for the present study. NAV values will be collected of selected Mutual Fund Schemes. Traditional tools (Standard deviation and Beta) Modern Tools (Safety First Ratio and Treynor Ratio) Forecasted tools (Mean Absolute Percentage Error and R-Squared) these Risk measurement techniques are used to analyze, compare, identify and forecast risk pattern of Debt fund, Equity fund and Hybrid fund.

<table>
<tr><th>Mutual Fund</th><th>Mutual Fund Scheme</th><th colspan="6">Risk Measuring Tools</th></tr>
<tr><th></th><th></th><th colspan="2">Traditional Tools</th><th colspan="2">Modern Tools</th><th colspan="2">Forecasted Tools</th></tr>
<tr><td rowspan="2">Debt Fund</td><td>SBI Magnum Gilt –LTP Fund</td><td rowspan="2">Standard Deviation</td><td rowspan="2">Beta</td><td rowspan="2">Safety First Ratio</td><td rowspan="2">Treynor Ratio</td><td rowspan="2">Mean Absolute Percentage Error</td><td rowspan="2">R-Squared</td></tr>
<tr><td>CANARA Robeco Liquid Fund</td></tr>
<tr><td rowspan="2">Equity Fund</td><td>UTI MNC Fund</td><td rowspan="2">Standard Deviation</td><td rowspan="2">Beta</td><td rowspan="2">Safety First Ratio</td><td rowspan="2">Treynor Ratio</td><td rowspan="2">Mean Absolute Percentage Error</td><td rowspan="2">R-Squared</td></tr>
<tr><td>Franklin India Smaller Cos Fund</td></tr>
<tr><td rowspan="2">Hybrid Fund</td><td>HDFC Balanced Fund</td><td rowspan="2">Standard Deviation</td><td rowspan="2">Beta</td><td rowspan="2">Safety First Ratio</td><td rowspan="2">Treynor Ratio</td><td rowspan="2">Mean Absolute Percentage Error</td><td rowspan="2">R-Squared</td></tr>
<tr><td>UTI MIS Advantage Plan</td></tr>
</table>

Table 4: Various Risk Measuring Tools Used To Measure Selected Mutual Fund Schemes

a) **Mutual fund Scheme:** Mutual fund scheme is selected on the basis of CRISIL Mutual Fund ranking (2014) in which top two rated Equity Fund, Debt Fund and Hybrid Fund are selected. The data will be collected with the help of NAV values of selected Mutual Fund Schemes from 2011-2015.

b) **Risk Measurement Tools:** There are various types of risk measurement tools used to analyze the risk of mutual fund schemes. It is found that Risk manager frequently used Standard Deviation, Beta, Sharpe ratio etc. to measure risk of Mutual fund schemes. Risk manager don't use other systematic risk tools to measure risk of Mutual fund schemes. In the present study Standard Deviation and Beta are used as traditional tools while Safety First Criterion Ratio and Treynor ratio as modern tools to measure risk. The present study helps mutual fund risk manager to identify and compare the appropriate risk measuring techniques for mutual fund. Various types of Risk measurement techniques are used to satisfy objectives 1, 2 and 3 of the present study. Risk measurement techniques helps to compare, identify and forecast risk pattern of Debt fund, Equity fund and Hybrid fund.

c) **Traditional Tools:** In the present study Standard Deviation and Beta are used as traditional tools because it is identified in the previous researches that most of the researcher and Risk manager frequently used Standard Deviation and Beta to measure risk of Mutual fund schemes. Traditional tools help to satisfy objective 1 and 2 of the present study. The outcome of Traditional tools applied on selected mutual fund schemes helps to compare and identify the appropriate risk measuring techniques for mutual fund. It also helps to know average risk pattern of Debt fund, Equity fund and Hybrid fund. The traditional tools to measure risk of mutual fund scheme are given below:

i. **Standard Deviation:** It is a statistical tool used to analyze the annual rate of return investment to measure the volatility of particular funds.

ii. **Beta:** Beta is a statistical tool used to measure risk of particular fund and to analyze its expected rate of return in relation to the market as a whole.

d) **Modern Tools:** In the present study Safety First Criterion Ratio and Treynor ratio are used as modern tools to measure risk. These are systematic risk measurement tools which are not used very much frequently in the researches or to measure risk of Mutual fund schemes. Modern tools help to satisfy objective 1 and 2 of the present study. The outcome of modern tools applied on selected mutual fund schemes helps to compare and identify the appropriate risk measuring techniques for mutual fund. It also helps to know average risk pattern of Debt fund, Equity fund and Hybrid fund. The modern tools to measure risk of mutual fund scheme are given below:

i. **Safety First Criterion:** It is an approach that decide minimum required rate of return at a given level of risk.

ii. **Treynor Ratio:** Treynor ratio can be defined as the highest and lowest excess return generated by the performance of fund at a given level of risk free rate of return.

e) **Forecasted Tools:** In the present study Mean absolute percentage error and R- Squared are used as forecasted tools to predict risk pattern of selected mutual fund schemes. Forecasted tools help to satisfy objective 3 of the present study. The outcome of Forecasted tools applied on selected mutual fund schemes helps to recommend prospective investment plans to common investors. The forecasted tools to measure risk of mutual fund scheme are given below:

i. **Mean Absolute Percentage Error:** Mean absolute percentage deviation is a forecasting method that helps to measure the risk or maximum loss of particular funds or securities.

ii. **R-Squared:** R^2 measure the correlation and movement of the particular fund return to the benchmark return.

f) **T-Test: T-Test:** In the present study T-Test is used to analyze the questionnaire which will be collected from the risk managers of the various mutual funds. T- Test helps to satisfy objective 3 of the present study which helps to identify the appropriate risk measuring techniques for mutual fund. There is a finite population so, half of the finite population will be considered for the present study. T Test is a statistical tool used to test hypothesis of population means when standard deviation is unknown.

4.4 Managerial Implications of the Study

Present study emphasis on the comparison of traditional tool like Standard Deviation, Beta, and modern tool like Safety First Criterion Ratio and Treynor Ratio for risk measuring of mutual fund Industry. The study helps mutual fund risk manager to identify and compare the appropriate risk measuring techniques for mutual fund. The proposed study would help to understand the current state of mutual fund industry with respect to risk measurement techniques. This particular study would help to understand the present scenario and future opportunities of Mutual Fund Industry and also helps to compare the performance of various Mutual Funds like Debt fund, Equity fund, and Hybrid fund. This study helps fund managers and investors to identify the funds and construct their portfolio which would minimizes the risk and maximize the return. Proposed research work would reveal various advantages and disadvantages of risk measuring technique and to know appropriate risk measuring techniques for mutual fund. The study is applicable for the risk managers to identify appropriate risk measuring techniques for mutual fund industry. This study helps to use efficient risk measuring techniques for creating efficient portfolio for investment. Mutual fund industry's future is bright because there are many opportunities available in the domestic as well as in global financial market. The proposed study is applicable for all the stakeholders of the mutual fund industry.

SECTION 5: PROPOSED CHAPTERIZATION

The Thesis structure of the proposed study will be as follow:

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Research Methodology

Chapter 4: Data Analysis & Findings

Chapter 5: Recommendation& Conclusion

References

Appendix

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